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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

JUL 31 2001

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
Petition of WorldCom, Inc. Pursuant)
to Section 252(e)(5) of the)
Communications Act for Expedited)
Preemption of the Jurisdiction of the)
Virginia State Corporation Commission)
Regarding Interconnection Disputes)
with Verizon Virginia Inc., and for)
Expedited Arbitration)
)
In the Matter of)
Petition of Cox Virginia Telecom, Inc., etc.)
)
In the Matter of)
Petition of AT&T Communications of)
Virginia Inc., etc.)
)

CC Docket No. 00-218

CC Docket No. 00-249

CC Docket No. 00-251

VERIZON VIRGINIA INC.

VOLUME III OF IV

**PANEL TESTIMONY ON UNBUNDLED NETWORK ELEMENT
AND INTERCONNECTION COSTS (CONTINUED)
(Public Version)**

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VERIZON VIRGINIA INC.

**Testimony of Donald Albert, Ralph Curbelo, Joseph Gansert,
Nancy Matt, Louis Minion, Carlo M. Peduto II, Gary Sanford,
and John White**

July 31, 2001

**VERIZON VIRGINIA INC. PANEL TESTIMONY ON
UNBUNDLED NETWORK ELEMENTS AND
INTERCONNECTION COSTS**

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1 **VI. LOCAL SWITCHING**
2 **(JDPL Issues II-1-II-1-d; II-2-c-d; IV-30; IV-36)**

3 **A. ELEMENT DESCRIPTION**

4 **Q. What does this section of the testimony address?**

5 A. This section addresses the basic methodology that Verizon VA used to
6 calculate switching costs in its recurring cost studies. Verizon VA first
7 describes the costing tools that were utilized, and then the methodology.

8
9 **Q. What function is performed by a switch?**

10 A. The purpose of a switch is to establish a transmission connection between
11 two end users. When a customer places a call, the switch establishes a
12 transmission path between the originating end user (calling party) and the
13 terminating end user (called party). Switches also permit telephone
14 companies to offer services such as call waiting and call-forwarding, which
15 are referred to generally as “switch features.” The switching network works
16 in conjunction with the signaling network, which we address in more detail
17 separately in this testimony.

18
19 **Q. What is the Commission’s definition of the local circuit switching**
20 **network element?**

21 A. FCC Rule 47 C.F.R. § 319(c)(1) defines local circuit switching capability as:

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- 1 (i) Line-side facilities, which include, but are not limited to, the
2 connection between a loop termination at a main distribution
3 frame and a switch line card;
- 4 (ii) Trunk-side facilities, which include, but are not limited to, the
5 connection between trunk termination at a trunk-side cross-
6 connect panel and a switch trunk card; and
- 7 (iii) All features, functions and capabilities of the switch, which
8 include, but are not limited to:
- 9 (A) The basic switching function of connecting lines to
10 lines, lines to trunks, trunks to lines, and trunks to
11 trunks, as well as the same basic capabilities made
12 available to the incumbent LEC's customers, such as a
13 telephone number, white page listing and dial tone; and
- 14 (B) All other features that the switch is capable of
15 providing, including but not limited to, customer
16 calling, customer local area signaling service features,
17 and Centrex, as well as any technically feasible
18 customized routing functions provided by the switch.
- 19

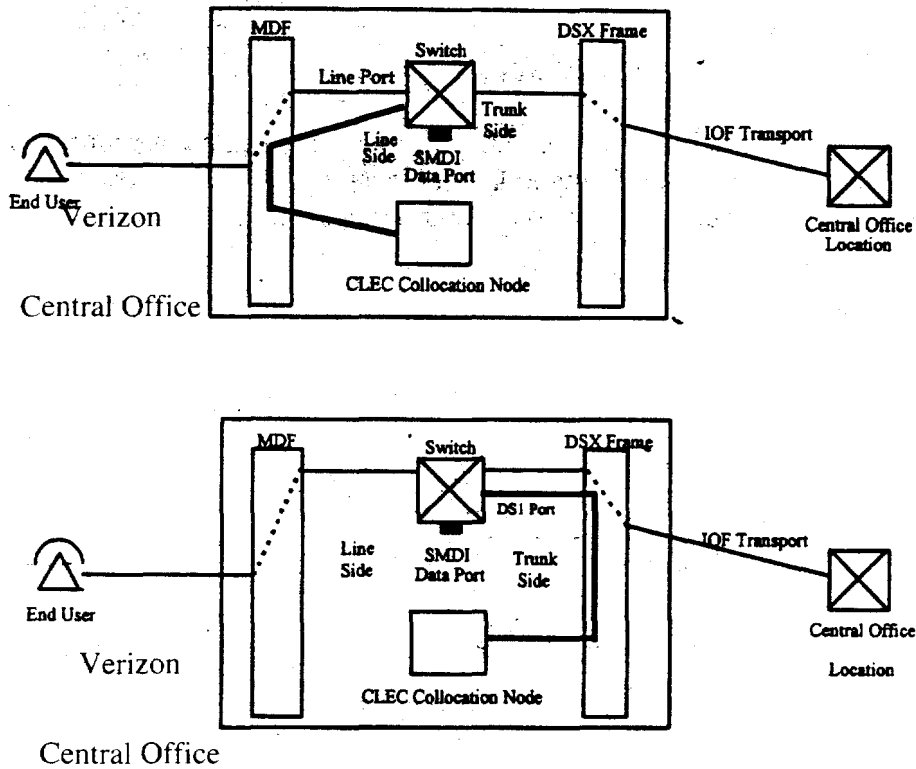
20 **Q. What local switching rate elements are included in Verizon VA's cost**
21 **studies?**

- 22 A. The Local Switching element addressed in Verizon VA's cost study consists
23 of the following components:
- 24 (1) Line ports (analog, digital, and coin);
- 25 (2) Trunk ports (digital);
- 26 (3) Local Switch Usage (terminating and originating); and
- 27 (4) Reciprocal Compensation Usage (terminating).

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The diagrams below simplistically show the line and trunk port components:

Figure 2



Q. What is a switch feature?

A. A switch feature is a service provided by the switch in addition to its normal function of establishing transmission paths, *e.g.*, call waiting. Switch features can be customized for each customer and are operated by the computing domain of the switch.

Q. Does the Local Switching element contain any switch features?

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1 A. Yes. Features that can be provisioned through the switch processor and that
2 do not require any specific, unique hardware are included in the Local
3 Switching Usage element. A list of these features can be found in the VZ-
4 VA CS, Vol. VI, part C-8, Section 5.8.

5
6 **Q. How can a carrier purchase a feature that requires specific, unique**
7 **hardware that is not included in the Local Switching Usage element?**

8 A. The most commonly used features that have specific, unique hardware
9 requirements can be purchased from Verizon VA as “port additives.” The
10 port additive cost studies identify the monthly costs associated with each
11 feature being studied. A list of those features can be found in the VZ-VA CS,
12 Vol. V, Part C-1, Section 1.1.

13
14 **Q. What rate would Verizon VA charge if a carrier wished to purchase a**
15 **feature that is not included in Local Switching Usage or offered as a port**
16 **additive?**

17 A. The vast majority of the commonly used features are included in Local
18 Switching Usage, or are available as port additives. In the event that a carrier
19 wishes to purchase an obscure feature not listed in VZ-VA CS, Vol. VI, Part
20 C-8 or VZ-VA CS, Vol. V, part C-1, Verizon VA would price the particular
21 features requested by the carrier on an individual case basis.

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1

2 **B. TECHNOLOGY ASSUMPTIONS**

3 **Q. What assumptions about switching equipment and facilities did Verizon**
4 **VA use to make its switching cost study forward-looking?**

5 A. Verizon VA examined its current switching equipment and facilities and
6 constructed a forward-looking end office switch based on current growth
7 trends. Verizon VA made the following technological assumptions:

- 8 (1) All digital switching (Verizon VA has only three analog switches);
9 (2) An access line split of 86% 5ESS (Lucent switch type), 3.65% DMS-
10 100 (Nortel switch type); 10.35% EWSD (Siemens switch type),
11 based on current growth trends;
12 (3) 10% GR-303 peripherals;
13 (4) 47.6% of the lines provisioned using integrated DLC TR-008
14 peripherals and 42.4% on analog line ports (copper cable pairs and
15 universal DLC); and
16 (5) Line concentration of 3:1 at the remote terminal of GR-303 DLC.

17

18 **Q. What is the reason for the mix of the three switch vendor technologies?**

19 A. Verizon VA currently uses three suppliers to ensure strategic diversity in the
20 sources of supply for an important network asset. Since Verizon VA
21 anticipates continuing this strategy, the mix of 5ESS, DMS-100, and EWSD

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1 technologies represents Verizon VA's forward-looking construct for local
2 switches.

3

4 **Q. What is the basis for Verizon VA's assumptions of 10% GR-303, 47.6%**
5 **TR-008, and 42.4% analog peripherals?**

6 A. These assumptions are explained in detail in the loop section of this panel
7 testimony.

8

9 **Q. How do these assumptions affect switching costs?**

10 A. These assumptions affect the type of ports included in the Local Switching
11 cost studies.

12

13 **Q. How does the 3:1 line concentration ratio assumption affect switching**
14 **costs?**

15 A. This assumption affects the number of GR-303 ports included in the Local
16 Switching cost studies.

17

18 **Q. What locations are assumed for switches in Verizon VA's study?**

19 A. Consistent with the Commission's TELRIC regulations, the study assumes
20 current wire center (and, therefore, switch host/remote) locations.

21

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1 C. COSTING APPROACH

2 1. Material Investments

3 Q. How were material investments developed for the switching study?

4 A. The material investments for the switch were developed using the Switching
5 System Cost Information System model developed by Bellcore (now known
6 as Telcordia). SCIS is a computer system that has two modules:
7 SCIS/Model Office (SCIS/MO) and SCIS/Intelligent Network (SCIS/IN).
8 SCIS/MO develops switching investments and the processor-related
9 investments associated with features that do not require any specific, unique
10 hardware. As explained more fully below, SCIS/MO allows the user to
11 construct a customized “model office” based on that user’s variables.
12 SCIS/IN develops incremental investments associated with vertical switch
13 features. A more detailed explanation of SCIS in general can be found in the
14 Cost Manual.

15
16 Q. Is the SCIS model generally accepted by the telecommunications
17 industry?

18 A. Yes. NERA recently published a paper in which it concluded that the
19 economic principles used in Telcordia’s models, such as SCIS, “are

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1 consistent with the rules and principles used by regulators to determine the
2 costs associated with network elements and interconnection.”¹ SCIS and
3 other Telcordia models using similar principles have been used in cost
4 studies filed with this Commission and state commissions throughout
5 Verizon’s footprint.

6
7 **Q. How did Verizon VA utilize SCIS in its study?**

8 A. SCIS/Model Office (SCIS/MO) lets the user “build” (*i.e.*, specify) a model
9 office, which is representative of a typical office in the network. The user
10 determines inputs, such as the number of access lines, and SCIS/MO then
11 determines the investment costs for that model office.

12 To build the model offices, Verizon VA’s engineering organization
13 first determined existing office parameters. Forward-looking adjustments
14 were then made, based on current growth trends. These produced inputs that
15 were used to create SCIS model offices for DMS-100, 5ESS, and EWSD
16 technology. SCIS then calculated, separately for each switch technology
17 type, the unit and total switch material investments.

18

¹ *An Economic Evaluation of Network Cost Models*, National
Economic Research Associates, August 7, 2000.

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1 **Q. What inputs did Verizon VA use to determine switching costs with**
2 **SCIS?**

3 A. As noted above, the following inputs were derived from Verizon VA's
4 existing switches and then adjusted to make them forward-looking, based on
5 current growth trends:

- 6 (1) 10% of the lines for each switch were designed on GR-303
7 peripherals;
8 (2) 47.6% of the lines for each switch were designed on TR-008
9 peripherals;
10 (3) All remaining lines were designed on the latest available analog line
11 peripherals;
12 (4) The current number of lines, trunks, and average busy hour (BH) CCS
13 (per line and trunk) per switch were adjusted based on the Verizon
14 VA's current growth trends.

15
16 **Q. What version of SCIS was used for Verizon VA's study?**

17 A. The latest available version of SCIS/MO — Version 2.8 — was used.
18

19 **Q. How are vendor prices for switching equipment reflected in SCIS?**

20 A. Vendor list prices are built into each version of SCIS. The vendor discounts,
21 which are applied to the material investments, are inputs supplied by the user.

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1

2 **Q. Are the estimates of material investments that are based on the discounts**
3 **that Verizon VA will actually receive conservative?**

4 A. Yes. Over time, Verizon continues to upgrade the different components of
5 Verizon VA's digital switches. Regulatory mandates and vendor
6 enhancements continually require network additions and modifications. The
7 forward-looking material investments presented here do not capture future
8 switch-related costs Verizon will have to incur to meet such regulatory
9 requirements.

10

11 **2. Switch Discount**

12 *a) Appropriate Switch Discount for TELRIC*
13 *Switching Studies*

14 **Q. What switch discounts did Verizon VA use in its cost studies?**

15 A. Verizon VA used the switch discount that it will actually receive when
16 deploying switching equipment in the foreseeable future.

17

18 **Q. Why is the actual discount Verizon VA will receive in the foreseeable**
19 **future appropriate for TELRIC studies?**

20 A. The actual discount that Verizon VA will receive when purchasing the latest
21 available digital switching technology in the future is appropriate for
22 determining TELRIC switching costs because it is the most accurate indicator

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1 of forward-looking costs. The forward-looking switching technology — the
2 basis of the switching costs presented here — will be deployed by Verizon
3 VA incrementally, at the discount rates Verizon actually receives. This
4 construct *does not* represent the mixture of switching equipment components
5 Verizon has currently deployed in its network. Rather, it represents the
6 mixture of switching equipment components Verizon is purchasing
7 incrementally to upgrade and expand its switching network, on a forward-
8 looking basis.

9
10 **Q. Has this Commission accepted the use of actual switch discounts as the**
11 **appropriate assumption for calculating switching rates?**

12 A. Yes. In its SBC Kansas/Oklahoma 271 Order, the Commission agreed with
13 the state commission's conclusion that the appropriate discount rates for
14 switches were the actual discounts received. The ALJ determined, and the
15 Commission agreed, that predictions based on information other than the
16 current contracts would be inherently inaccurate.²

² See Memorandum Opinion and Order, *Joint Application by SBC Communications, Inc., Southwestern Bell Telephone Co., and Southwestern Bell Communications Services, Inc. d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Kansas and Oklahoma*, CC Docket No. 00-217, FCC 01-29, ¶ 77 (rel. Jan. 22, 2001)

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1

2

3

*b) Methodology for Determining Appropriate
Discount*

4

Q. Please describe Verizon's methodology for determining the switch discount that Verizon will actually receive when deploying switching equipment.

5

6

7

A. Verizon examined the overall discount it actually received for its most recent purchases of switching equipment under the current contracts. As discussed above, Verizon's methodology is appropriate because:

8

9

10

(1) It is the overall discount Verizon actually receives (and will continue to receive) when purchasing switching equipment;

11

12

(2) It is based on the mix of equipment that Verizon is actually deploying in its network, including all types of switching equipment such as processors, trunks, lines, and peripherals;

13

14

15

(3) It captures all "credits" offered within the contracts;

16

17

(4) It is based on the actual material prices Verizon paid for switching equipment, not on an interpretation of Verizon's complex contracts or a hypothetical model; and

18

19

(5) It is based exclusively on vendor-supplied data concerning their list prices and discount prices of switching equipment (hardware) sold to Verizon.

20

21

22

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1 **Q. Please describe how this was accomplished.**

2 A. Verizon asked each of its switching vendors to provide a detailed list of all
3 switching equipment (hardware) purchases Verizon made during the past year
4 (2000), and to include actual quantities, list prices, and prices Verizon paid
5 for the equipment. From this information, Verizon calculated an overall
6 effective discount it actually received during the timeframe the purchases
7 were made, by comparing the total list price of all purchases made versus the
8 actual total price paid.

9

10 **Q. Please describe how Verizon calculated the Lucent switch discount.**

11 A. Lucent provided Verizon with its equipment purchases for the entire year
12 2000 for Verizon East's states³. The overall effective discount Verizon
13 received during this timeframe was developed by summarizing these
14 purchases. This is the discount Verizon VA used in the switching cost study
15 and is shown in VZ-VA CS, Vol. IX, part C-P1, Page 1, Line 14E.

16

17 **Q. Do you believe the Lucent 2000 purchase data represents the types of**
18 **equipment purchases Verizon will be making from Lucent in the future?**

³ Excluding 10% of the lowest dollar value orders.

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1 A. Absolutely. As explained above, the data includes the types of switching
2 equipment purchases, typical of what Verizon purchases in any given year.
3 For example, this data includes additions, upgrades, and regulatory and
4 manufacturer mandated equipment modifications.

5
6 **Q. Please describe how Verizon calculated the Nortel switch discount.**

7 A. Nortel provided Verizon with its equipment purchases for the entire year
8 2000 for Verizon East's states. However, since Verizon signed new
9 agreements with Nortel in December 2000, Verizon did not use the discount
10 based on these purchases to develop its switching costs, because it does not
11 capture the latest material prices available to Verizon from Nortel.

12 Instead, Verizon calculated the discount by examining the new
13 agreement with Nortel. The Nortel contracts signed in December 2000
14 included an attachment that depicts the equipment prices that Verizon will
15 pay, along with estimated quantities of this equipment. Upon request from
16 Verizon, Nortel also provided an expanded version of the attachment
17 depicting the resulting discount level received. Verizon estimated the overall
18 discount by summarizing the purchases shown in the current Nortel contracts.

19 Verizon VA believes this discount represents an appropriate estimate
20 of the forward-looking discount Verizon East will actually incur under the
21 latest contracts with Nortel. This is the discount Verizon VA used in the

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1 switching cost study and is shown in VZ-VA CS, Vol. IX, Part C-P2, Line
2 35G.

3

4 **Q. How did Verizon VA determine the equipment quantities shown in the**
5 **attachment to the Nortel contract?**

6 A. The types of equipment and quantities shown in the attachment to the Nortel
7 contract were determined by Verizon switch planners, and represents their
8 best estimate of what Verizon East will be purchasing over the next three
9 years from Nortel.

10

11 **Q. Please describe how Verizon VA determined the forward-looking**
12 **Siemens discount.**

13 A. Siemens provided to Verizon VA its equipment purchases in Virginia for the
14 entire year 2000. Verizon VA used this information to calculate overall
15 effective discount for Siemens equipment. This is the discount Verizon
16 Virginia used in the switching cost study and is shown in VZ-VA CS, Vol.
17 IX, Part C-P3, Page 5, Line 25F.

18

19 **Q. Do you believe the Siemens 2000 purchase data represents the types of**
20 **equipment purchases Verizon VA will be making from Siemens in the**
21 **future?**

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1 A. Absolutely. As explained above, the data includes all types of switching
2 equipment purchases, typical of what Verizon VA purchases in any given
3 year. This data, for example, includes additions, upgrades, and regulatory
4 and manufacturer mandated equipment modifications.

5
6 **Q. Please explain why for Lucent Verizon VA used the purchased data for**
7 **the entire Verizon East footprint, yet for Siemens Verizon VA used only**
8 **the purchases made for Virginia.**

9 A. Siemens could only provide Verizon VA with Virginia data.

10

11 **Q. Are the forward-looking discounts appropriate to use for both end-office**
12 **and tandem switches?**

13 A. Yes. These discounts are appropriate to use in calculating costs of both types
14 of switches because both types of switches were included in the purchase data
15 used to calculate the discount.

16

17 **3. Utilization**

18 **Q. How is utilization accounted for in the switching cost studies?**

19 A. Like in other cost studies, Verizon VA applied a utilization factor to each
20 type of equipment investment (digital line ports, analog line ports, and digital
21 trunk ports). Utilization was not applied against usage investment.

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1

2 **Q. How was the forward-looking utilization for digital trunk ports**
3 **determined?**

4 A. The cost study uses a forward-looking trunk DS1 utilization of [VERIZON
5 **VA PROPRIETARY BEGINS] XXX [VERIZON VA PROPRIETARY**
6 **ENDS]** which is Verizon VA's current operating objective for digital trunks.
7 Verizon VA's actual switch utilization for digital trunk capacity, however, is
8 **[VERIZON VA PROPRIETARY BEGINS] XXX [VERIZON VA**
9 **PROPRIETARY ENDS].**

10

11 **Q. How was the forward-looking utilization for digital line ports**
12 **determined?**

13 A. The digital line port utilization factor for the switch digital line ports is
14 **[VERIZON VA PROPRIETARY BEGINS] XXX [VERIZON VA**
15 **PROPRIETARY ENDS].** In general, the utilization rate of lines at the DLC
16 remote terminal is higher than the utilization of switch digital line ports (used
17 with IDLC). This is so because to provide dial tone using switch digital line
18 ports, capacity is needed at the switch and at the DLC remote terminal.
19 Switching capacity is installed first, ahead of DLC remote terminal capacity.
20 Therefore, in actual practice, utilization of switch digital line ports is lower
21 than utilization of lines at the DLC remote terminal.